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# TRANSMITTAL OF APPEAL BRIEF (Small Entity)

Docket No. 14281

In re Application of: LENEHAN, Peter

| Application No. | Filing Date | Examiner | Customer No. | Group Art Unit | Confirmation No. |
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| 09/845,513 | April 30, 2001 | ALEXANDER, Lyle | 23676 | 1743 | 2082 |

Invention: **PORTABLE OXYGEN SENSOR ANALYZER**

COMMISSIONER FOR PATENTS:

Transmitted herewith is the Appeal Brief in this application, in response to the Notification of Non-Compliant Appeal Brief dated December 22, 2005.

☒ Applicant claims small entity status. See 37 CFR 1.27

☒ The fee for filing this Appeal Brief is: **$250.00**

☒ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **19-2090.**

Denton L. Anderson
Signature

Dated: January 23, 2006

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES**

| | | |
|---|---|---|
| In re application of: | ) | Group Art Unit: 1743 |
| | ) | |
| Peter Lenehan | ) | Examiner: Lyle Alexander |
| | ) | |
| Application No.: 09/845,513 | ) | |
| | ) | |
| Filing Date: April 30, 2001 | ) | Date mailed: January 23, 2006 |
| | ) | |
| For: PORTABLE OXYGEN SENSOR ANALYZER | ) | Pasadena, California |
| | ) | |

**APPEAL BRIEF**

Mail Stop Appeal Brief - Patents
COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an appeal from the final rejection dated March 11, 2005, of the claims in the above-referenced application.

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## I. REAL PARTY IN INTEREST

The real party in interest is Peter Lenehan.

## II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences presently pending that are known to appellant or appellant's attorney.

## III. STATUS OF CLAIMS

This appeal is taken from the final rejection of March 11, 2005, by the Examiner of claims 1, 2, and 4-13. Claims 3 and 14-18 were previously canceled. Claim 2 has been subsequently canceled by amendment after final rejection. Claims 1 and 4-13 are pending in this application. Claims 1 and 4-13 are being appealed.

## IV. STATUS OF AMENDMENTS

An Amendment and Request for Reconsideration was filed in response to the Final Office Action of November 26, 2004, the Amendment canceling claim 2.

## V. SUMMARY OF CLAIMED SUBJECT MATTER

Applicant's invention relates generally to the field of vehicle emission controls.

Independent claim 1 is directed to a hand-held oxygen sensor analyzer that has three modes of operation. Page 3, Lines 4-13. The first mode is a closed loop oxygen sensor monitor, which shows, in real time, on an ultra-bright display comprised of a plurality of LED's disposed in series, the dynamic operation of the oxygen sensor. Page 6, Lines 19-28. The second mode simulates oxygen sensor signals to the computer, while monitoring the real oxygen sensor to see the reaction to the simulation. Page 6, Lines 29-31 and Page 7, Line 1-21. The third mode performs the official oxygen sensor test, without the requirement of using propane to force the engine lean. Page 6, Lines 22-28 and Page 7, Lines 1-2

Independent claim 4 is directed to an oxygen sensor analyzer for testing the performance of oxygen sensors of a vehicle emission system having a circuit for receiving oxygen sensor signals from the oxygen sensor while disconnected from the on-board computer. Page 4, Lines 11-19. A closed-loop mode where the simulated output directly follows the oxygen sensor input. Page 8, Line 10-29. A simulated mode where the simulate output is driven in an arbitrary manner for forcing the engine to run lean or run rich and a display for indicating the oxygen sensor signal. Page 9, Line 4-10

Independent claim 12 is directed to a portable oxygen sensor analyzer for use in testing the performance of an oxygen sensor comprising a portion of a vehicle emission system having an on-board computer. Page 4, Lines 20-30. Having an electronic circuit having an oxygen sensor input for receiving an oxygen sensor signal from the oxygen sensor, with the oxygen sensor disconnected from the on-board computer, over a voltage range of from approximately 0 V representing a most lean operating condition of the engine to approximately 1 V representing a most rich operating condition of the engine. Page 1, Lines 5-11. Utilizing a simulated output for connection to the on-board computer in place of the oxygen sensor. Page 4, Lines 25-29. The simulate output being a closed-loop mode wherein the simulate output directly follows the oxygen sensor input. Page 8, Lines 10-25. A simulated mode where the simulated output is driven in an arbitrary manner for forcing the engine to run one or both of lean or rich. Page 6, Lines 19-28. A test mode where the simulate output is driven in a predetermined manner that includes forcing the engine to run lean by driving the simulate output to a first predetermined value and running rich as signaled by a second predetermined value higher than the first predetermined value. Page 9, Lines 4-23. Continuously displaying the oxygen sensor signal. Page 8, Lines 25-26.

## VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claim 1 is rejected under 35 U.S.C. §103(a) as being unpatentable over Anderson, Bienkowski, Luchaco, or Ezoe et al. alone or in view of Zaleski.

B. Claims 4-13 are rejected under 35 U.S.C. §102(b) as being clearly anticipated by Anderson, Bienkowski, Luchaco, or Ezoe et al.

## VII. ARGUMENT - THE REJECTIONS SHOULD BE REVERSED

A. Introduction

As detailed below, the Examiner's rejections should be reversed because:

1. The Examiner's rejection of claims 4-13 under 35 U.S.C. §102(b) is improper:

(a) Each of the Anderson, Bienkowski, Luchaco, and Ezoe et al. reference fail to disclose Applicant's invention.

(b) The claimed invention is patentably distinct from the references in that (i) the references do not suggest Applicant's invention; and (ii) dependent claims are directed to patentable subject matter.

2. The Examiner's rejection of claim 1 under 35 U.S.C. 103(a) is improper because none of the references, alone or in combination, discloses or suggests Applicant's invention.

B. The Examiner's Rejection of Claim 4-13 Under 35 U.S.C. §102(b) Is Improper

1. The rejection of claims 4-13 under 35 U.S.C. 102(b) is believed to be inappropriate because none of the Anderson, Bienkowski, Luchaco, and Ezoe et al. reference nor any of the other references discloses any of the following:

(a) The combination of a housing having a keypad with plural keys and indicator lights, and operative to provide plural operating modes including (i) a closed loop oxygen sensor mode to show real-time dynamic operation of the oxygen sensor being tested; (ii)

a simulated oxygen sensor mode, feeding simulated oxygen sensor signals to the vehicle computer while monitoring the sensor for reactions to the simulation; and (iii) an oxygen sensor test mode in which the engine is forced to run lean without injection of propane (claim 1);

(b) The combination of an electronic circuit for receiving an oxygen sensor signal and having a simulated output for connection to a vehicle on-board computer in place of the oxygen sensor signal, with logic for driving the simulated output in (i) a closed-loop mode, the simulated output directly following the oxygen sensor signal, and (ii) a simulated mode, the simulated output being driven arbitrarily in isolation from the oxygen sensor signal for forcing the engine to run one or both of lean and rich, and a display for indicating the oxygen sensor signal (claims 4 and 12);

Claim 5

(c) The above combination with an additional test mode, the simulated output being driven arbitrarily in isolation from the oxygen sensor signal for forcing the engine to run lean, and the logic monitoring the time response of the oxygen sensor signal between lean running and rich running of the engine (claims 5 and 12);

Claim 6

(d) The above combination wherein the logic means signals a ready condition in the test mode when the engine reaches a stable lean condition, then enabling

measurement of the time response of the oxygen sensor signal indicating operation passing from lean toward rich (claims 6 and 12);

Claim 7

(e) The above combination wherein the oxygen sensor signal has a range including a first value representing a lean condition, the ready condition being signaled only after a predetermined interval of operation with the sensor signal representing a more lean operating condition (claims 7 and 12); and

Claim 9

(f) The second combination above, including a timer for measuring an interval between the oxygen sensor signal having a first value representing a lean condition and a second value representing a rich condition, and circuitry for signaling a passing condition of the sensor if the measured interval is sufficiently short (claim 9); and

(g) The second combination with a plurality of indicators continuously activated in accordance with predetermined oxygen sensor signal levels.

It is respectfully submitted that none of the references anticipates Applicant's invention. As the CCPA has stated:

> "Rejections under 35 U.S.C. 102 are proper only where the claimed subject matter is identically disclosed or described in prior art (citation). In other words, to constitute an anticipation, all material elements recited in a claim must be found in one unit of prior art."
> In re Marshall, 198 USPQ 344, 346 (CCPA 1973).

It is clear that none of the references satisfies this test. Applicant emphasizes that as to the rejected claims 4 and 12, the references disclose nothing regarding a circuit driving an oxygen sensor input of a fuel injection system arbitrarily in isolation from the sensor. More particularly, the fuel injection systems of Anderson and Luchaco, and the monitoring device of Bienkowski, each always maintain a connection from the oxygen sensor to apparatus controlling air/fuel ratios, whereas Applicant's invention has at least one operating mode in which the simulated output to *the oxygen sensor input of the fuel system is driven in an arbitrary manner in isolation from the oxygen sensor*. The Ezoe et al. reference also apparently maintains this connection of the oxygen sensor to the apparatus controlling the air/fuel mixture, except when the impedance of the sensor is being measured, during which time the sensor input to the apparatus is open and, presumably, the engine is not in operation. More particularly, the additional gas sensor detector (Fig. 4) of Ezoe et al., while being connected to a switch for disconnecting the sensor from the feedback control (oxygen sensor input), that sensor input is left open, and is *not* driven in an arbitrary manner as claimed by Applicant. It is clear that this additional detector is used only for measuring the internal impedance of the sensor as disclosed at

Col. 11, Lines 25-29, and there is no monitoring of a sensor reaction to arbitrary driving of the sensor input by the claimed circuit. The apparatus of Ezoe et al., as well as those of Anderson, Bienkowski, and Luchaco, thus cannot be in anticipation of Applicant's claimed invention in that only Applicant provides both a closed loop mode in which the simulated output directly follows the sensor input, and an open-loop mode in which the simulated output is driven in an arbitrary manner in isolation from the sensor input. Further, none of the references discloses a display of the oxygen sensor output, the additional detector of Ezoe et al. indicating only whether the internal impedance of the sensor is within a preset range.

2. No combination of the references renders the claimed invention obvious, in that none of the references, either alone or in combination, discloses or suggests Applicant's multiple modes of operation including the closed loop mode in which the simulated output directly follows the oxygen sensor input, and an open loop mode in which the simulated output is driven in an arbitrary manner in isolation from the sensor signal. Even consideration of the Zaleski reference fails to render Applicant's invention obvious in that Zaleski fails to disclose or suggest substitution of a simulated sensor signal for the oxygen sensor input to the on-board computer.

Claims 5-11 and 13

3. The dependent claims 5-11 and 13 are further believed to be allowable based on the subject matter of claims 1 and 12 from which they depend, because they further

limit allowable subject matter, and because they contain additional limitations that are neither disclosed or suggested by the prior art as outlined above. More particularly, at least each of the rejected dependent claims 5, 6, 9, and 10 are believed to further patentably distinguish over the prior art. Claim 5 (and claim 9, dependent thereon) requires an *additional* test mode in which oxygen sensor time-response to a sudden change in air/fuel ratio is measured. Claim 6 (dependent on claim 5) further requires that after a stable ready condition of the engine is signaled, time response of the sensor is measured at the point of engine operation passing from lean to rich. Claims 7 and 8 (dependent on claim 6) further require the ready condition to be inhibited until the engine operates more lean than the stable condition. Claims 10 and 11 (dependent on claim 4) further require a plurality of indicators that are continuously activated in accordance with predetermined oxygen sensor signal levels. Finally, claim 13 (dependent on claim 12) requires two predetermined values of 175 mV and 800 mV respectfully to monitor the oxygen sensor's response time to the simulated input signals.

## C. The Examiner's Rejection of Claim 1 Under 35 U.S.C. §103(a) Is Improper

The rejection of claim 1 under 35 U.S.C. 103(a) is believed to be inappropriate because none of the Anderson, Bienkowski, Luchaco, Ezoe et al., and Zaleski reference, either alone or in combination, discloses or suggests the combination of a housing having a keypad of plural keys and indicator lights, being operative to provide plural operating modes, including (a) a closed loop oxygen sensor monitor mode for showing real time dynamic operation of the oxygen sensor being tested; (b) a simulated oxygen sensor mode in which simulated oxygen sensor signals are

fed to the vehicle computer, the oxygen sensor being monitored for its reaction to the simulation; and (c) an oxygen sensor test mode in which the oxygen sensor is tested in response to the analyzer forcing the engine to run lean without requiring propane injection.

Claim 1 corresponds generally to the first two combinations outlined in the prior section (claim 4 as further limited by 5), with the additional limitations of a housing having a keypad with indicator lights. As discussed above, none of the references, either alone or in combination, discloses or suggests Applicant's combination which provides both a closed loop mode of operation, and an open loop mode with simulated oxygen sensor signals input to the vehicle computer. Also, the references fail to disclose Applicant's claimed device which shows in real time the dynamic operation of the oxygen sensor being tested.

As to this last point, the Anderson reference shows nothing about the operation of the sensor; the Bienkowski reference shows only whether the sensor signal is above or below 0.45 volts; the Luchao reference discloses indication only of whether sensor transitions were abnormally slow, not real-time dynamic operation; and the Ezoe reference discloses indication of whether the sensor output frequency is above or below a predetermined level (or within a range) - neither the frequency nor the level of the signal is displayed in real time.

The Zaleski reference discloses a test device (having a housing, keys and display) that is connectable to the electronics data bus only of a vehicle, but neither discloses nor suggests

simulating oxygen sensor signals to the vehicle computer, the oxygen sensor itself being isolated from the data bus in that the engine control module (which would typically include a computer corresponding to the on-board computer recited in the preamble of Applicant's claim 1, the oxygen sensor being interfaced to that computer). Thus the device of Zalenski would be incapable of simulating oxygen sensor signals to the on-board computer as claimed by Applicant.

## VIII. CONCLUSION

For the reasons presented above it is submitted that the Examiner was in error in rejecting claims 1 and 4-13; the rejections should be reversed; and these claims should be held allowable.

The Commissioner is authorized to charge the $250 fee to file this Appeal Brief, as well as any other necessary fees, to Deposit Account No. 19-2090.

Respectfully submitted,

SHELDON & MAK
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Date 1/23/06

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## IX. CLAIMS APPENDIX

1. An oxygen sensor analyzer for use in testing the performance of an oxygen sensor comprising a portion of a vehicle emission system having an on-board computer, said oxygen sensor analyzer comprising:

a housing having a keypad, said keypad having a plurality of keys and indicator lights disposed thereon; and

a plurality of modes of operation, comprising:

a closed loop oxygen sensor monitor mode, for showing, in real time, the dynamic operation of the oxygen sensor being tested;

a simulated oxygen sensor mode, for simulating oxygen sensor signals o the vehicle computer, while monitoring the oxygen sensor for its reaction to the simulation; and

a oxygen sensor test mode, for performing an oxygen sensor test which forces the engine to run lean without the need for injecting propane thereinto.

2. An oxygen sensor analyzer for use in testing the performance of an oxygen sensor comprising a portion of a vehicle emission system having an on-board computer, the oxygen sensor analyzer comprising:

(a) an electronic circuit having an oxygen sensor input for receiving an oxygen sensor signal from the oxygen sensor with the oxygen sensor disconnected from the on-board computer, a simulated output for connection to the on-board computer in place of the oxygen sensor, and logic means operative for driving the simulated output in:

(i) a closed-loop mode wherein the simulated output directly follows the oxygen sensor input; and

(ii) a simulated mode wherein the simulated output, being isolated from the oxygen sensor input, is driven in an arbitrary manner for forcing the engine to run one or both of lean by driving the simulated output to simulate a rich indication from the oxygen sensor, and rich by driving the simulated output to simulate a lean indication from the oxygen sensor; and

a display for indicating the oxygen sensor signal.

5. The oxygen sensor analyzer of claim 4, wherein the logic means is further operative for:

(a) driving the simulated output in a test mode wherein the simulated output, being isolated from the oxygen sensor input, is driven in a predetermined manner that includes forcing the engine to run lean by driving the simulated output to simulate a rich indication from the oxygen sensor; and

(b) monitoring the oxygen sensor input to measure time-response thereof between conditions of the engine running lean and running rich.

6. The oxygen sensor analyzer of claim 5, wherein the logic means is further operative for signaling a ready condition in the test mode wherein the oxygen sensor input is indicative of the engine having reached a stable lean operating condition, and subsequently enabling the measure of time response when the oxygen sensor input is indicative of engine operation passing from lean toward rich.

7. The oxygen sensor analyzer of claim 6, wherein the oxygen sensor input is responsive over a voltage range including a first predetermined value representing a lean operating condition of the engine, the signaling of the ready condition being inhibited until the sensor input maintains for a predetermined period of time a voltage representing a more lean operating condition than that represented by the first predetermined value.

8. The oxygen sensor analyzer of claim 7, wherein the voltage range is from approximately 0 V representing a most lean operating condition of the engine to approximately 1 V representing a most rich operating condition of the engine, the first predetermined value being approximately 175 mV.

9. The oxygen sensor analyzer of claim 5, wherein the electronic circuit comprises a timer for measuring a passing interval within which the oxygen sensor input changes from a first predetermined value representing a lean operating condition of the engine to a second predetermined value representing a rich operating condition of the engine, the electronic circuit being operative to signal a passing condition only if the oxygen sensor input reaches the second predetermined value within a predetermined period of time.

10. The oxygen sensor analyzer of claim 4, wherein the display comprises a plurality of indicators, each of the indicators being activated by the electronic circuit continuously in response to the oxygen sensor input in accordance with a predetermined range of the oxygen sensor signal.

11. The oxygen sensor analyzer of claim 10, wherein the oxygen sensor input is responsive over a voltage range of approximately 1 volt and at least one of the indicators is activated when the oxygen sensor input is within the voltage range.

12. A portable oxygen sensor analyzer for use in testing the performance of an oxygen sensor comprising a portion of a vehicle emission system having an on-board computer, the oxygen sensor analyzer comprising:

(a) an electronic circuit having an oxygen sensor input for receiving an oxygen sensor signal from the oxygen sensor, with the oxygen sensor disconnected from the on-board computer, over a voltage range of from approximately 0 V representing a most lean operating condition of the engine to approximately 1 V representing a most rich operating condition of the engine, a simulated output for connection to the on-board computer in place of the oxygen sensor, and logic means operative for driving the simulated output in:

(i) a closed-loop mode wherein the simulated output directly follows the oxygen sensor input;

(ii) a simulated mode wherein the simulated output, being isolated from the oxygen sensor input, is driven in an arbitrary manner for forcing the engine to run one or both of lean by driving the simulated output to simulate a rich indication from the oxygen sensor, and rich by driving the simulated output to simulate a lean indication from the oxygen sensor;

(iii) a test mode wherein the simulated output, being isolated from the oxygen sensor input, is driven in a predetermined manner that includes forcing the engine to run

lean by driving the simulated output to simulate a rich indication from the oxygen sensor, the logic means being further operative for signaling a ready condition after the engine reaches a stable lean operating condition as signaled by the oxygen sensor input remaining for a predetermined period of time below a first predetermined value representing a lean operating condition of the engine, and subsequently monitoring the oxygen sensor input to measure time-response thereof between conditions of the engine running lean as signaled by the oxygen sensor input passing the first predetermined value and running rich as signaled by the oxygen sensor reaching a second predetermined value being higher than the first predetermined value; and

(b) a display for continuously indicating the oxygen sensor signal.

13. The oxygen sensor analyzer of claim 12, wherein the first predetermined value is approximately 175 mV and the second predetermined value is approximately 800 mV.

## X. EVIDENCE APPENDIX

The Anderson, Bienkowski, Luchaco, Ezoe, and Zaleski references were entered into the record by the Examiner in the Office Action dated 02/12/2004.